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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/995,200	11/26/2001	Yu-Chiang Cheng	8688.251US01	9398

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EXAMINER

PATEL, ISHWARBIHAI B

ART UNIT PAPER NUMBER

2827

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,200

Applicant(s)

CHENG, YU-CHIANG

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 7-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 27-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) = . 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of specie VI, claims 1-6 and 27-34, reading on figure 10, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirements, the election has been treated as an election without traverse (MPEP § 818.03(a)).

The requirement is still deemed proper and is therefore made FINAL. However, upon allowance of a generic claim, additional species which are in dependent form or otherwise include all the limitations of an allowed generic claim, as provided by 37 CFR 1.141, will be rejoined.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 and 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snodgrass et al., US Patent No. 5,311,406, hereafter, Snodgrass.

Regarding claim 1, Snodgrass discloses a multi-layer circuit board comprising:
at least two metal layers and at least two signal wiring layers disposed one above the other, at least one of said metal layers being a ground metal layer,
at least one of said metal layers being a power metal

layer (signal layers 10 and 240, any two of the other layers, 30 to 230, include ground / power layer, see figure 4); and

a plurality of insulating substrates disposed sequentially one above the other, each adjacent pair of said metal layers and said signal wiring layers being spaced apart by one of said insulating substrates; wherein at least one of said signal wiring layers is suitable for high-speed low-impedance signal transmission (dielectric sheets 20, 40, etc., adjacent to metal layers 10, 30, 50 etc., and signal layer 10 configured to form high frequency circuit, see figure 4, column 4, line 40-60),

said at least one of said signal wiring layers that is suitable for high-speed low-impedance signal transmission being separated from the adjacent one of said metal layers by an adjacent one of said insulating substrates, which is made from a first insulator material having a first dielectric coefficient; the other ones of said insulating substrates that are not adjacent to said at least one of said signal wiring layers being made of a second insulator material having a second dielectric coefficient that is lower than the first dielectric coefficient (dielectric sheet 20 made of PTFE material has higher dielectric coefficient than that of 40 made of fiberglass material, see figure 4, column 4, line 40-62 and column 3, line 10-25), but

fails to explicitly disclosing the signal layer, metal layer 10, has a resistance relative to an adjacent one of said metal layers within the range of 25.2 to 30.8 ohms.

However, the crux of the invention of Snodgrass it to have the dielectric constant adjusted to have the desired functionality of the high frequency circuitry, as disclosed, column 1, line 36-45, the dielectric constant of sheet with PTFE can be adjusted within the required range.

Further, the desired value can be achieved by changing other variables, such as thickness of the substrate and the metal layer and the width of the trace.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the structure of Snodgrass with the signal layer, metal layer 10, with a resistance relative to an adjacent one of said metal layers within the range of 25.2 to 30.8 ohms, apparently to have the desired functionality of the high frequency circuitry with better electrical performance.

Further, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 2, Snodgrass further discloses the second dielectric coefficient is about 4.5, (fiber glass has a dielectric constant about 4.0, see column 1, line 30-35).

Regarding claim 3, Snodgrass further discloses the first dielectric material as PTFE with coefficient adjustable between 2 to 11, which covers the range, see column 1, line 40-45).

Regarding claim 4, Snodgrass further discloses the second insulator material is glass fiber reinforced epoxy resin (fiber glass layer).

Regarding claim 27-34, the applicant is claiming fifteen insulating layers with corresponding metal layer and various location of the first and second insulating material for the insulating layers.

Though, Snodgrass does not discloses the specific arrangement of the metal layers and the dielectric layers, the invention of Snodgrass is to have the combination of insulating material with different dielectric coefficient and their the arrangement with respect to the metal layers to have better performance of high frequency circuitry.

Further, Snodgrass discloses layers 40 to 240, alternating metallic sheet and dielectric sheets of predetermined thickness of predetermined dielectric materials, some of which can include PTFE and material dissimilar from PTFE, along with external metal layer 250 and predetermine internal metallic layers used for strip line, see Snodgrass, figure 4, column 4, line 41-63.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the structure of Snodgrass with fifteen insulating layers with corresponding metal layer and various location of the first and second insulating material for the insulating layers, as claimed in claims 27-34, in order to have a circuit board for the desired functionality.

Further, it has been held that mere duplication of the essential parts of a device or rearranging parts of an invention involves only routine skill in the art, *In re Japikse*, 86 USPQ 70 and *St. Regis Paper Co. v. Bemis Co.* 193 USPQ 8.

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snodgrass, as applied to claims 1-3 above, and further in view of Arthur et al., US Patent No. Re36396, hereafter Arthur.

Regarding claim 5, Snodgrass does not explicitly disclose the ceramic filled polytetrafluoroethylene.

Snodgrass discloses polytetrafluoroethylene without any further detail, but ceramic filled polytetrafluoroethylene dielectric material for getting desired dielectric constant is known, and Snodgrass discloses the range of dielectric constant to be used depending upon the requirement.

Arthur discloses ceramic filled polytetrafluoroethylene for improved electrical performance.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the structure of Snodgrass with ceramic filled polytetrafluoroethylene, as taught by Arthur, in order to have the desired dielectric constant for the better functioning of the high frequency circuitry.

Regarding claim 6, Snodgrass does not explicitly disclose the detail about the dissipation factor of the first insulating material. Using insulating material with low dissipation factor is known in the art to have lower energy loss and better performance.

Arthur discloses a ceramic filled polytetrafluoroethylene to have dissipation factor as low as 0.002.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the structure of Snodgrass with ceramic filled polytetrafluoroethylene having dissipation factor 0.002, as taught by Arthur, in order to have lower energy loss and better performance of high speed circuitry.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ngounou Kouam et al., discloses a structure making use of a substrate with fluoropolymer such as PTFE having dissipation factor 0.002, see column 7, line 63 to column 8, line 25.

Noddin disclose a fluoropolymer substrate, including PTFE, with ceramic filler with low loss tangent, see column 27, line 25 to column 28, line 60.

Rainal discloses a high-speed chip carrier package with impedance matched, including signal, power, ground layers.

Iwane discloses circuit structure having both high frequency and low frequency circuitry including the ground layers.

Kuwabara et al., discloses circuit board with larger number of signal, power, ground layers.

Iwanami discloses circuit board with different dielectric materials for insulating layers.

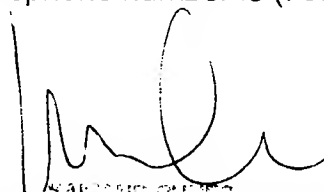
Sridharan et al., discloses multilayer microwave circuits with a ceramic filled dielectric substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (8:30 - 5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
June 12, 2003


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